



Docket No. - MIO 0079 PA
Title - SUPPRESSION OF CROSS DIFFUSION AND GATE DEPLETION
Inventor(s) - Trivedi et al.

ABSTRACT OF THE DISCLOSURE

According to the present invention, an ultrathin buried diffusion barrier layer (UBDBL) is formed over all or part of the doped polysilicon layer of a polycilicide structure composed of the polycrystalline silicon film and an overlying film of a metal, metal silicide, or metal nitride.

5 More specifically, according to one embodiment of the present invention, a memory cell is provided comprising a semiconductor substrate, a P well, an N well, an N type active region, a P type active region, an isolation region, a polycilicide gate electrode structure, and a diffusion barrier layer. The P well is formed in the semiconductor substrate. The N well is formed in the semiconductor substrate adjacent to the P well. The N type active region is defined in the P well and the P type active region is defined in the N well. The isolation region is arranged to isolate the N type active region from the P type active region. The polycilicide gate electrode structure is composed of a polycrystalline silicon film and an overlying metal, metal silicide, or metal nitride film. The polycrystalline silicon film comprises an N⁺ polysilicon layer formed with the N type active region and a P⁺ polysilicon layer formed with the P type active region. The diffusion barrier layer is formed in the polycilicide gate electrode structure over a substantial portion of the polycrystalline silicon film between the polycrystalline silicon film and the metal, metal silicide, or metal nitride film.